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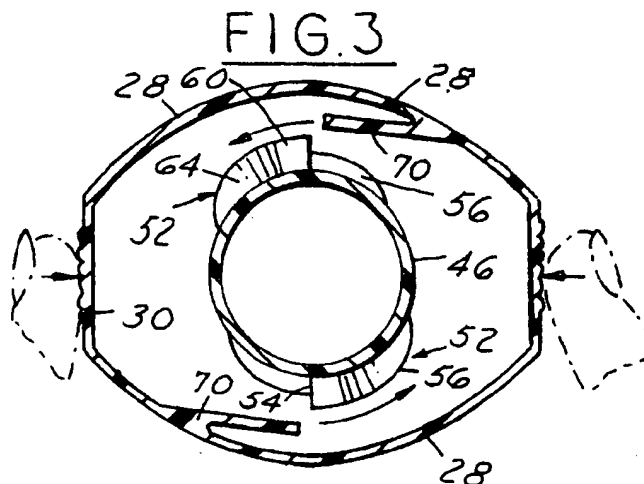
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(54) **Child-resistant screw closure**

(57) A squeeze and turn child resistant package including a container having a finish (46) and a closure having a base wall (26) and an outer peripheral flexible wall (28) depending from the base wall. The wall has an internal thread on the inner surface thereof, the finish has an external thread thereon. The closure has an internal surface with spaced flexible chordal lugs (70) extending circumferentially in the direction of removal of the closure. The container finish has opposed radially extending abutments (52). Each abutment includes a radial abutting surface (54). The finish of the container in-

cludes an integral radial projection (56) adjacent the radial abutting surface of the abutment which has a lesser radial extent than the abutment. The radial projection has a chordal surface extending to the intersection of the radial abutting surface on the finish such that the chordal lug (70) on the closure is forced toward the intersection when a closure is rotated in a retrograde direction to remove the closure without flexing the peripheral wall. The finish has stops (50) below the threads engaging a blunt end leading end (51) of the thread on the closure to limit the movement of the closure and orient the closure.

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## Description

This invention relates to child resistant packages and particularly to such packages which are of the squeeze and turn type.

## Background and Summary of the Invention

In typical squeeze and turn child resistant packages, it is common to provide a container having opposed stop lugs and a closure which has lugs on the periphery thereof which engage the stop lugs on the container. To remove the closure, it must be squeezed to permit the lugs on the closure to be moved out of the path of the lugs on the container and the closure can then be unthreaded from the container. Typical patents showing such a construction are United States patents 3,949,893; 3,894,021; 4,116,351 as well as EPO WO 9/01924.

Such child resistant packages have been produced and have been successful in the marketplace. However, they sometimes are difficult to use, when efforts are made to make such packages easier to use and more user friendly, the closure may be defeated if the lugs on the closure are bent backward and the closure is rotated in an unthreading direction (counter clockwise), even though the closure has not been squeezed.

Accordingly, among the objectives of the present invention are to provide a child resistant package which is readily usable by an adult; more user friendly; and which can not be readily defeated.

In accordance with the invention, the squeeze and turn child resistant package comprises a container having a finish and a closure having a base wall and an outer peripheral flexible wall or skirt depending from the base wall. The wall has an internal thread on the inner surface thereof. The finish has an external thread thereon. The closure has an internal surface with spaced flexible chordal lugs extending circumferentially in the direction of removal of the closure. The container finish has opposed radially extending abutments, each abutment including a radial abutting surface. The finish of the container includes an integral radial projection adjacent the radial abutting surface of the abutment which has a lesser radial extent than the abutment. The radial projection also has a chordal surface extending to the intersection of the radial abutting surface on the finish such that the chordal lug on the closure is forced toward the intersection when a closure is rotated in a retrograde direction (counter clockwise) to remove the closure without flexing the peripheral wall. The finish also has stops below the threads engaging a blunt leading end of the thread on the closure to limit the rotation of the closure with respect to the container and orient the closure on the container.

## Description of the Drawings

FIG. 1 is an elevational view of a child resistant package embodying the invention.

FIG. 2 is a sectional view taken along the line 2-2 in FIG. 1.

FIG. 3 is a view similar to FIG. 2 showing the relative positions of the closure and the container when the closure is being removed.

FIG. 3A is a view similar to FIG. 2 showing the relative positions of the closure and container when an attempt is made to remove the closure in without squeezing

FIG. 4 is a fragmentary part sectional elevational view of a portion of the package.

FIG. 5 is an elevational view of the container.

FIG. 6 is a side elevational view of a container taken from the right in FIG. 5.

FIG. 6A is a fragmentary enlarged sectional view taken along the line 6A-6A in FIG. 6.

FIG. 7 is a plan view of the container shown in FIG. 5.

FIG. 8 is a fragmentary enlarged plan view of a portion of the container.

FIG. 9 is a perspective view of the closure.

FIG. 10 is a sectional view taken along the line 10-10 in FIG. 9.

FIG. 11 is a sectional view taken along the line 11-11 in FIG. 9.

FIG. 12 is a bottom plan view of the closure.

FIG. 13 is an elevational of a modified form of closure.

FIG. 14 is a sectional view taken along the line 14-14 in FIG. 13.

FIG. 15 is a sectional view taken along the line 15-15 in FIG. 14.

FIG. 16 is a bottom plan view of the closure shown in FIG. 14.

FIG. 17 is a sectional view of the closure shown in FIGS. 13-16 as applied to a container.

FIG. 18 is a fragmentary part sectional elevational view of the package shown in FIG. 17.

## Description of the Preferred Embodiments

Referring to FIGS. 1-12, the squeeze and turn child resistant package 20 embodying the invention comprises a container 22 and a closure 24. The container 22 is made of plastic such as polypropylene or polyethylene terephthalate and the closure is made of plastic, preferably polypropylene.

The closure 24 includes a base wall 26 and a peripheral wall or skirt 28 which is generally oval in cross section having a long axis and a short axis. Opposed flat finger engaging portions 30 are provided at the long axis (FIGS. 2, 9) and have vertical ribs 32 to facilitate grasping between the thumb and the finger. The closure further includes an inner annular wall skirt 34 having du-

al threads 36 (FIG. 4, 11). The leading end of each of the threads 36 on the closure is a blunt end, 38 for purposes presently described.

Referring to FIGS. 7 and 9, the container 22 is generally oval in horizontal cross section corresponding to the horizontal cross section of the closure 24 so when the closure is fully applied, the profiles of the closure 24 and container 22 conform. Thus, the container 22 has arcuate sides 40 and flat oppose sides 42 (FIG. 7). The container 22 further includes a shoulder 44 with a cylindrical finish 46 extending upwardly therefrom. The finish 46 has threads 48 complementary to the threads 36 on the closure 24. In addition an axial stop 50 is provided on each of the threads 48 and extends downwardly therefrom as shown in FIG. 6, for purposes presently described.

Referring to FIGS. 7 and 8, the finish 46 is formed with radially opposed abutments 52, each of which has a radially extending and axially extending surface 54. An upwardly and circumferentially extending radial projection 56 having a lesser radial extent than abutment 52 is provided adjacent the abutting surface 54 and includes a chordal surface 58 intersecting the abutting surface 54. Abutment 52 includes a flat upper radial surface 60 intersecting the axial surface 54. Abutment 52 further includes a circumferentially extending projection 62 which extends circumferentially from the axial surface 54 in a direction opposite to projection 56. Projection 62 has an upper inclined surface 64 extending in the direction of rotation of the closure 24 which the closure 24 is applied to the container 22.

The closure 24 includes opposed flexible chordal lugs 70 on arcuate walls 28. Each chordal lug 70 extends circumferentially in the direction of the removal of the closure and is hinged to the skirt along a vertical hinge area 72 and at its upper end on a horizontal hinge area 74 (FIGS. 2, 4, 11, 12).

When the closure 24 is rotated to apply the closure to the container 22 the chordal lugs 70 engage the ramp surface 64 and flex past the abutments 52 to assume the position such as shown in FIG. 2 preventing the closure 24 from being unscrewed. When the closure is to be removed the wall 28 is squeezed at portions 30, as shown in FIG. 3, causing the chordal lugs 70 to be moved outwardly beyond the abutment surfaces 54 so that the closure 24 can be unthreaded. If an attempt is made to remove the closure without flexing the wall 28, the chordal lugs 70 will engage the intersection of the axial abutting surface 54 on the finish 46 and the radial projection 56 on the finish 4 causing the wall 28 to flex outwardly as shown in FIG. 3A and causing the chordal lugs 70 to change their angular relationship further forcing the ends of the chordal lugs 70 into the intersection.

When the closure 24 is applied to the container 22 the blunt ends 38 on the threads of the closure 24 engage the stops 50 on the finish 46 (FIG. 6A). Each stop 50 includes a complementary axial surface 51 and thickened at its free end to strengthen the stop 50. This limits

the rotation of the closure 24 and align the oval closure 24 with the oval container 22. At the same time the stops 50 prevent over tightening and facilitates the removal of the closure by an adult.

In the form of the invention shown in FIGS. 13-18 the closure is circular in cross section and there is no need for a blunt thread or stop on the container since the closure need not be oriented with respect to the container. However, it can be included if there is a desire to prevent over tightening. In this form, for purposes of clarity corresponding numbers are provided to corresponding parts with a suffix "a". The container includes a radial flange 80 immediately beneath the closure when the closure is fully applied. It may be further noted that the closure does not have an inner skirt but that the threads on the closure are applied directly to the outer skirt. An annular flange 82 extends downwardly from the base wall of the closure and engages the opening of the container to provide a valve seal which is particularly useful when the package is used for handling liquid products.

It can thus be seen that there has been provided a child resistant package which is readily usable by an adult; more user friendly; and which can not be readily defeated.

#### Claims

1. A squeeze and turn child resistant package comprising

a plastic container having a finish,  
a plastic closure having a base wall and an outer peripheral flexible wall depending from said base wall,  
said closure having internal thread means thereon,  
said peripheral wall of said finish having an external thread means thereon,  
said peripheral flexible wall of said closure having an internal surface with spaced flexible chordal lugs extending circumferentially in the direction of removal of the closure,  
said container finish having opposed radially extending abutments spaced below said thread, each abutment including a radial abutting surface,  
said finish of said container including an integral radial projection adjacent said radial abutting surface of said abutment,  
said radial projection having a lesser radial extent than said abutment,  
said radial projection having a surface extending to the intersection of said radial abutting surface and said finish such that the chordal lug on said closure is forced toward the intersection when a closure is rotated in a retrograde direction in a direction to remove the closure without

flexing the peripheral wall.

2. The squeeze and turn child resistant package set forth in claim 1 wherein said container has a non-circular body portion and said closure has a peripheral wall having a non-circular cross section corresponding to that of the body, said finish of the container having downwardly extending axial stops extending downwardly from the threads thereof, said closure having a blunt leading end on the threads thereof engaging said downwardly extending stops on the finish to orient the closure with respect to the container.
3. The squeeze and turn child resistant package set forth in claim 2 wherein the configuration of said body of said container and said skirt of said closure are generally oval and have a long axis and a short axis and opposed vertical flat surfaces on the long axis on the closure and the container which form the gripping surfaces for holding the container and squeezing the skirt.
4. The squeeze and turn child resistant package set forth in claim 1 wherein said surface on said radial projection is at 90° to said abutting surface on said abutment.
5. The squeeze and turn child resistant package set forth in claim 1 wherein said chordal lugs are hinged to the inner surface of the skirt along a vertical axis and a horizontal axis.
6. The squeeze and turn child resistant package set forth in claim 1 wherein said internal threads of said closure are on an inner peripheral skirt.
7. The squeeze and turn child resistant package set forth in claim 1 wherein said finish of the container has axial stops extending downwardly from said threads of said finish and said closure having a blunt end on the threads thereof engaging said stops on said finish when the closure is applied to the container.
8. The squeeze and turn package set forth in any one of claims 1-7 wherein said container has a shoulder below said finish and said abutments are on said shoulder.
9. The squeeze and turn package set forth in any one of claim 1-7 wherein said container has a neck below said thread means, a flange on said neck, and said abutments are on said flange.
10. A container for a squeeze and turn package comprising
  - a plastic container having a finish, said container neck having an external thread thereon, said container having opposed radially extending abutments, each abutment including a radial abutting surface, said finish of said container including an integral radial projection adjacent said radial abutting surface of said abutment, said radial projection having a lesser radial extent than said abutment, said radial projection having a surface extending to the intersection of said radial abutting surface and said finish such that a chordal lug on said closure is forced toward said intersection when a closure is rotated in a retrograde direction in a direction to remove the closure without flexing the peripheral wall.
11. The container set forth in claim 10 wherein said container has axial stop extending downwardly from said threads of said finish.
12. The container set forth in claim 10 wherein said container has a non-circular body portion and said closure has a peripheral wall having a non-circular cross section corresponding to that of the body, said finish of the container having downwardly extending axial stops extending downwardly from the threads thereof, said closure having a blunt leading end on the threads thereof engaging said downwardly extending stops on the finish to orient the closure with respect to the container.
13. The container set forth in claim 12 wherein the configuration of said body of the container is generally oval and has a long axis and a short axis and has opposed vertical flat surfaces at the long axis.
14. The container set forth in any one of claims 10-13 wherein said container has a shoulder below said finish and said abutments are on said shoulder.
15. The container set forth in any one of claims 10-13 wherein said container has a neck below said thread means, a flange on said neck, and said abutments are on said flange.
16. A plastic closure for a squeeze and turn child resistant package which includes a container having a finish with external threads and opposed radially extending abutments spaced below the thread and an integral radial projection adjacent said abutments, said plastic closure having a base wall and an outer peripheral flexible wall depending from said base wall, said closure having internal thread means thereon.

eon adapted to engage threads on a container,  
said peripheral flexible wall of said closure hav-  
ing an internal surface with spaced flexible  
chordal lugs extending circumferentially in the  
direction of removal of the closure.

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17. The plastic closure set forth in claim 16 wherein said  
closure has a blunt leading end on the threads  
thereof adapted to engage downwardly extending  
stops on the finish to orient the closure with respect  
to the container.

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18. The plastic closure set forth in claim 17 wherein the  
configuration of said body of said skirt of said clo-  
sure is generally oval and has a long axis and a  
short axis and opposed vertical flat surfaces on the  
long axis on the closure which form the gripping sur-  
faces for squeezing the skirt.

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19. The plastic closure set forth in claim 16 wherein said  
chordal lugs are hinged to the inner surface of the  
skirt along a vertical axis and a horizontal axis.

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20. The plastic closure set forth in claim 16 wherein said  
internal threads of said closure are on an inner pe-  
ripheral skirt.

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21. The plastic closure set forth in claim 16 wherein said  
closure has a blunt end on the threads thereof en-  
gaging stops on a finish when the closure is applied  
to a container.

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FIG.1

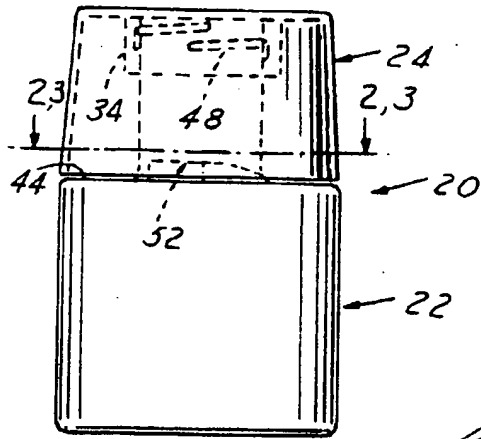


FIG.2

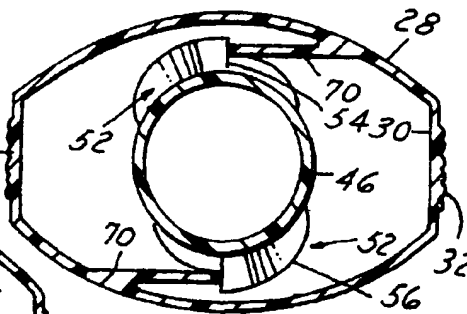


FIG.3

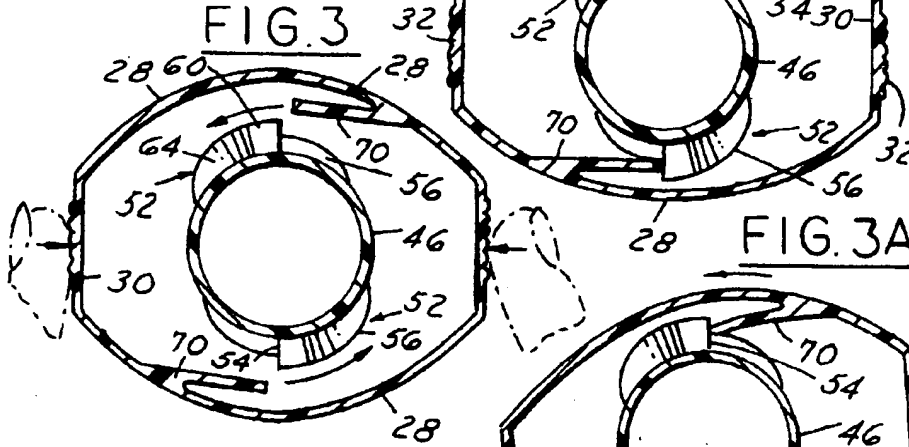


FIG.3A

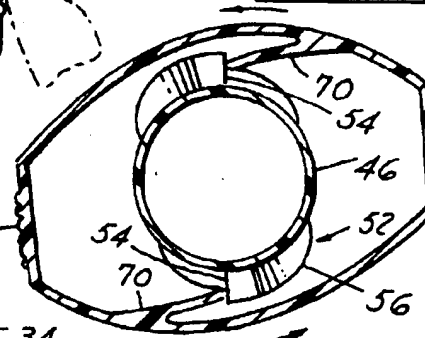


FIG.4

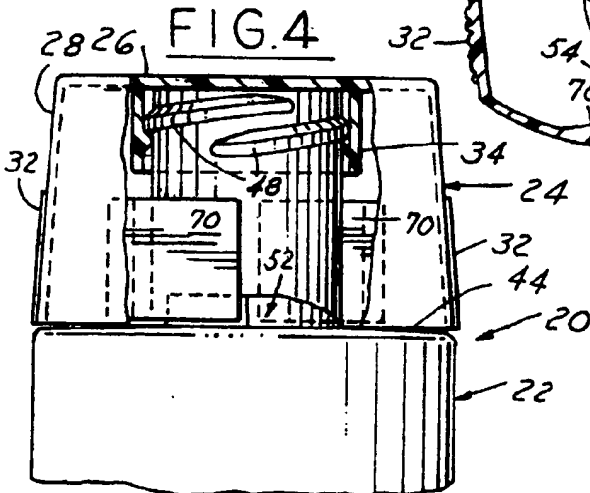


FIG. 5

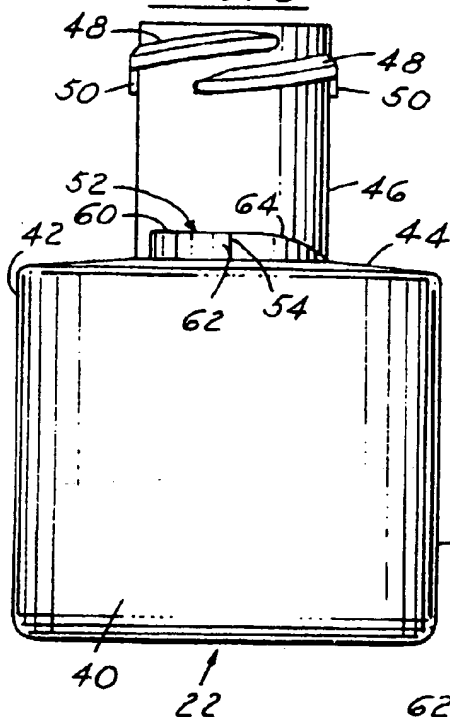


FIG. 6

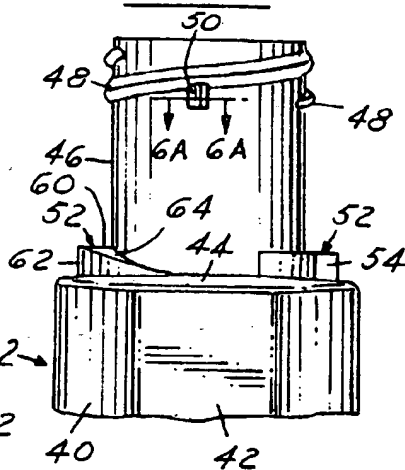


FIG. 7

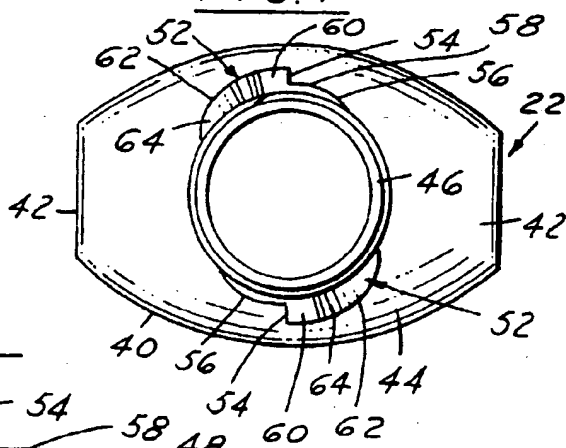


FIG. 8

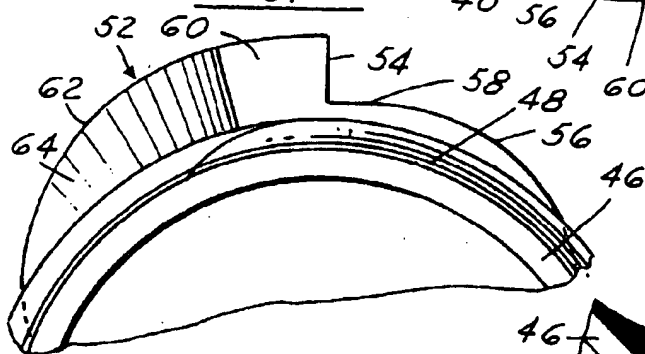
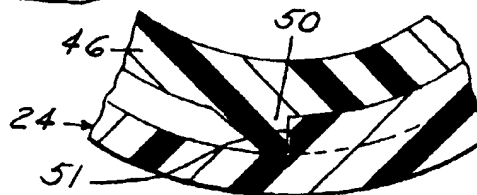
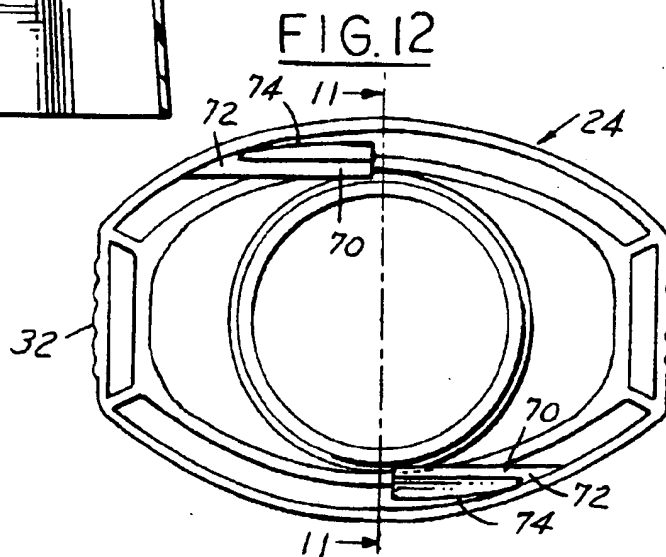
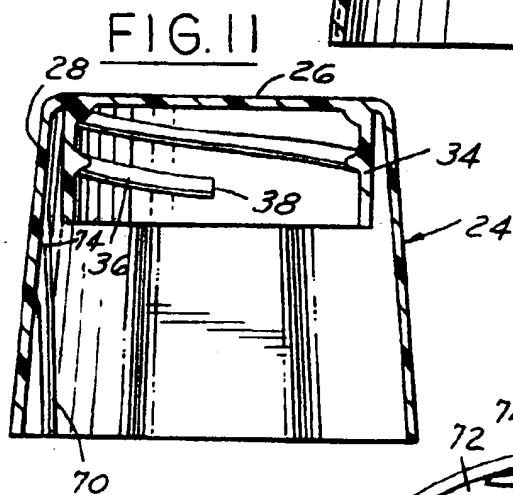
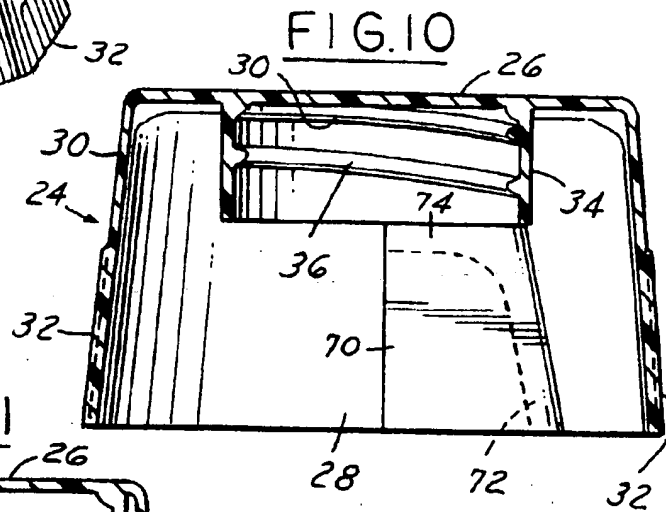
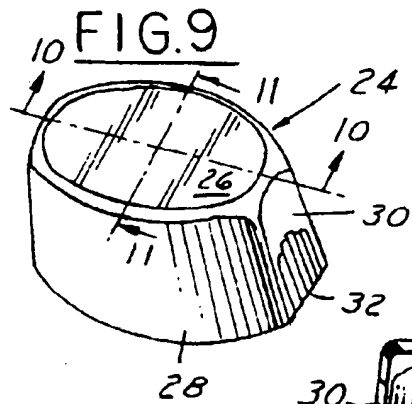
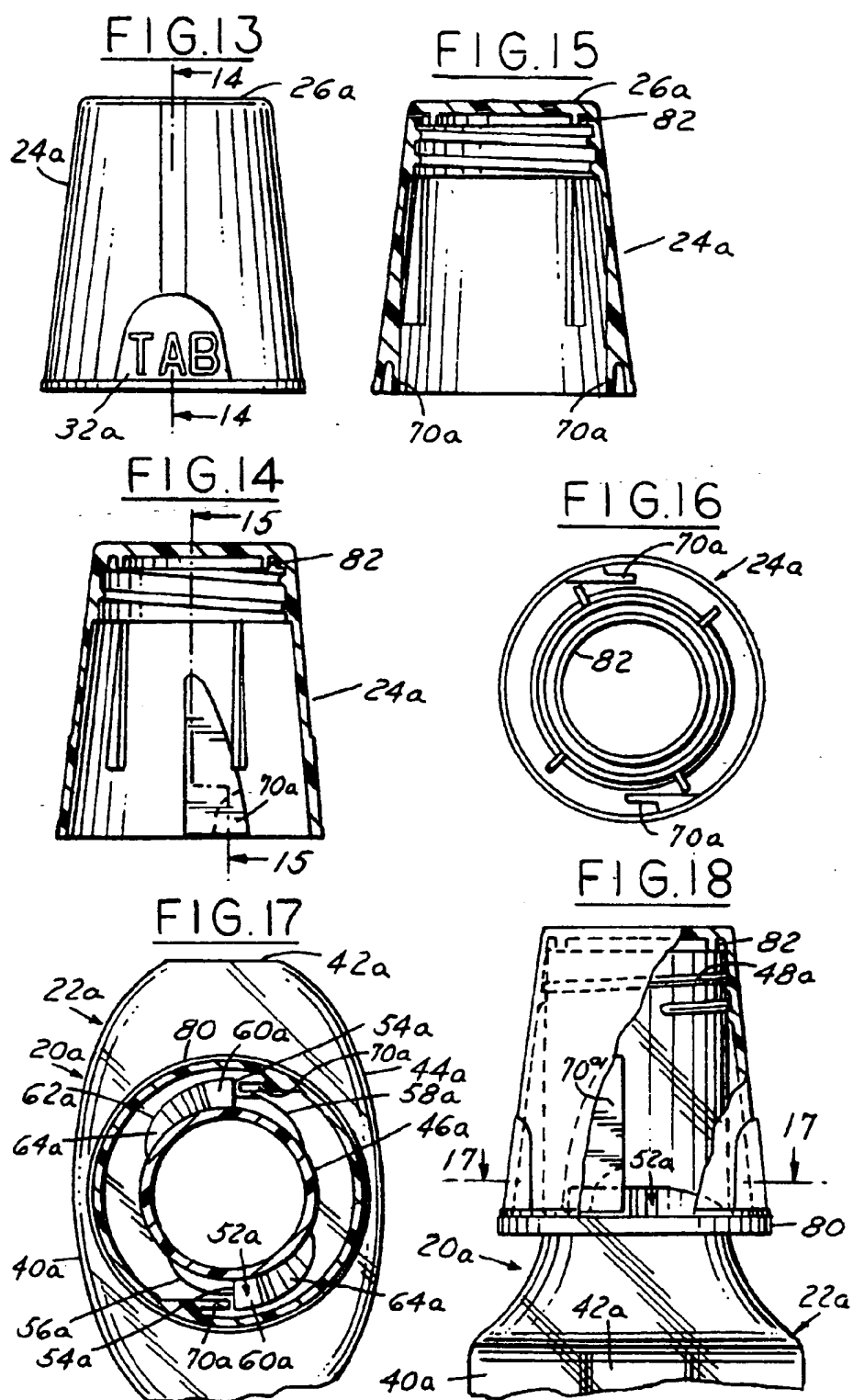


FIG. 6A











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## EUROPEAN SEARCH REPORT

Application Number  
EP 97 30 0506

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	GB 2 011 869 A (U.G.CLOSURES)  * page 1, line 89 - line 106 * * page 2, line 41 - line 53; figure 4 * ---	1,4, 8-10, 14-16	B65D50/04 B65D41/04
X	GB 2 105 693 A (U.G.CLOSURES)	1,4,7, 9-11, 15-17,21	
Y	* page 2, line 5 - line 47; figures * ---	2,3,5,6, 12,13, 18-20	
Y	US 4 535 906 A (ROWEKAMP)  * column 3, line 18 - column 4, line 35; figures *	2,3,12, 13,18	
Y	GB 1 535 051 A (UHLIG) * figures 1,2 *	5,19	
Y A	US 4 117 945 A (MUMFORD) * figures 1,2 * -----	6,20 5,19	TECHNICAL FIELDS SEARCHED (Int.Cl.6)  B65D
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>22 April 1997</b>	Examiner <b>Newell, P</b>
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  I : document cited for other reasons  &amp; : member of the same patent family, corresponding document</p>			

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